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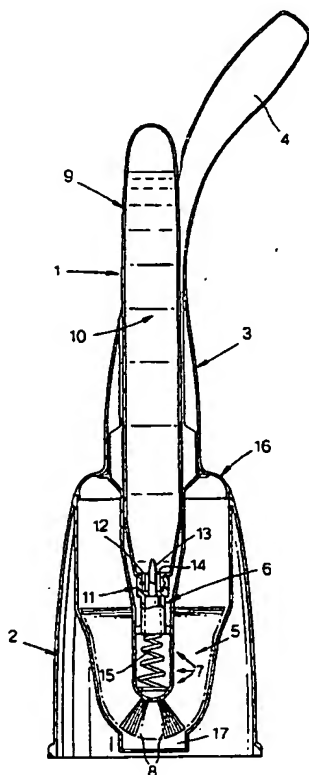
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[Continued on next page]

(54) Title: **HOUSEHOLD CLEANING TOOL**



(57) Abstract: The invention provides a household cleaning tool (1) comprising a elongate housing (3) having at one end an inclined handle (4) and at the other end a cleaning head (5), the housing further comprising: (a) connection means (11) located between the handle (4) and the cleaning head (5) for the engagement of a removable cartridge (9) of household cleaning fluid (10), and (b) pumping means (6) located between the connection means (11) and the cleaning head (5) for the transfer of household cleaning fluid (10) from the cartridge (9) to the cleaning head (5); in which the cartridge (9) is removable from the housing (3) by disengaging the connection means (11) and pulling the cartridge (9) from the housing (3), and in which the cartridge (9) is slidably received in the housing (3) and can be pushed down in the direction of the cleaning head (5) in order to actuate the pumping means (6) and thereby dispense the household cleaning fluid (10) from the cartridge (9) to the cleaning head (5) via the pumping means (6).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

HOUSEHOLD CLEANING TOOL

5 Field of the Invention

This invention relates to household cleaning tools. More particularly the invention relates to household cleaning tools which incorporate a replaceable cartridge for
10 household cleaning fluid and which are particularly suitable for cleaning bathroom fixtures such as toilets or urinals.

Background of the Invention

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When cleaning toilets, the use of a bottle of cleaning liquid in combination with a cleaning tool such as a brush results in considerable wastage through use of excess cleaning liquid. The corrosive or irritant nature of some
20 cleaning products means that the user prefers not to dose product directly onto the cleaning tool because of the risk of spillage. This has resulted in the habit of pouring the fluid into the toilet then brushing to remove soil. If a controlled dose of cleaning fluid could be applied to the
25 brush without risk of spillage, this could then be applied directly to the soil, minimising wastage of product and environmental harm through excessive use of detergent product.

30 A number of attempts have been made to tackle this problem in the prior art. WO 99/23926 discloses a toilet brush

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which is kept in a storage container, where the container
squirts cleaning fluid onto the brush when the brush is
pressed into the container, while DE 198 04 064 has a pump
actuated fluid spray, again in the brush container, to apply
5 cleaning fluid to the brush head prior to use. These
systems do not overcome the risk of spillage of harmful
product when removing the brush from the container for use.

WO01/03542 and DE3439912 are examples of prior art that
10 reveal product applicator brushes attached to gas-
pressurised cleaning fluid containers by a sleeve member.
DE 2331694 reveals a cleaning brush with a pressurised fluid
cartridge in the handle, replaced by unscrewing the handle
from the cleaning head at the base of the handle.

15 US 5,888,002 discloses a disposable toilet brush with a
cleaning fluid in a squeezable reservoir.

WO 00/42892 and EP 0 210 522 are examples of prior art
20 showing brushes with refillable cleaning fluid reservoirs
while WO99/52397 discloses a brush with an elongate
reservoir which is refillable at the top end and where fluid
is released over the brush by urging the brush head away
from the open, lower end of the reservoir.

25 DE 29718117U1 has a brush with a hollow shaft for storage of
solid disinfectant cartridges.

EP 0 175 505 discloses a cleaning brush with a replaceable
30 collapsible cartridge operated by an external trigger.

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The prior art has a number of problems. Users are not prepared to handle any part of the toilet brush other than the handle part, remote from the soiled cleaning head, because of the health hazards associated with the soil.

5 Similarly, any operation that leads to the head of the brush being held above the handle can lead to soiled liquid or cleaning fluid running down the handle and coming into contact with the user.

10 In the household environment, users are not prepared to clean the toilet brush or wash any of the soiled parts because of the risk of contaminating otherwise clean washing areas. Hence the disclosed routes that involve the refilling of a reservoir all involve handling the
15 potentially soiled area of the brush in order to refill the reservoir. Also, the refilling operation with the often corrosive or irritant cleaning fluid is considered messy and potentially hazardous.

20 Any use of a gas-pressurised reservoir is considered dangerous, in the context of toilet hygiene use, where children will have access to the apparatus. Also the use of propellant solvents is undesirable with respect to environmental and/or flammability issues.

25

Summary of the Invention

The present invention provides a household cleaning tool
30 comprising an elongate housing having at one end an inclined

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handle and at the other end a cleaning head, the housing further comprising:

(a) connection means located between the handle and the
5 cleaning head for the engagement of a removable cartridge of household cleaning fluid, and

(b) pumping means located between the connection means and the cleaning head for the transfer of household cleaning
10 fluid from the cartridge to the cleaning head;

in which the cartridge is removable from the housing by disengaging the connection means and pulling the cartridge from the housing,

15 and in which the cartridge is slidably received in the housing and can be pushed down in the direction of the cleaning head in order to actuate the pumping means and thereby dispense the household cleaning fluid from the
20 cartridge to the cleaning head via the pumping means.

The household cleaning tool according to the invention is convenient to operate and in particular can be refilled by removal an empty cartridge and installing a fresh one
25 without the user ever having to handle the soiled cleaning head end.

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Preferred Embodiments and Detailed Description of the
Invention

The cartridge may be pushed down to dispense the household
5 cleaning fluid, either by the user pushing directly on the
cartridge itself, or indirectly by means of a trigger-type
actuation mechanism, whereby the handle of the tool is
provided with a trigger which engages with a corresponding
slot on the cartridge, to push it down when the trigger is
10 grasped by the user. This latter form of indirect actuation
may be preferable for users with small or weak hands.

Although the cartridge can be returned manually to its
starting position after it has been pushed down to dispense
15 the household cleaning fluid, it is preferred that a biasing
means such as a spring is located between the pumping means
and the cleaning head. This serves to return the cartridge
back to its starting position without user intervention,
which facilitates rapid repeated dosing of household
20 cleaning fluid in a metered fashion to the desired site.

It is advantageous for reasons of safety and economy to
prevent spillage of cleaning fluid when the cartridge is
changed. This is suitably achieved by providing the
25 cartridge with a self sealing closure which acts to prevent
leakage of household cleaning fluid from the cartridge when
the cartridge is removed from the housing. A preferred form
of self-sealing closure is a flexible septum, which is
typically made of silicone rubber. This is suitably used in
30 conjunction with a piercing means, such as a hollow needle.
The needle is provided in the housing in a location such

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that when the cartridge is screwed down to install it into the housing, the needle pierces the flexible septum, thereby allowing cleaning fluid to flow. The flexible septum reseals when a spent cartridge is withdrawn from the needle
5 and removed from the housing, at least, to a sufficient degree to prevent dripping and leakage of any residual cleaning fluid which may be left in the spent cartridge.

10 An additional advantage of the needle and flexible septum arrangement described above is that this enables self-venting of the cartridge. This prevents the formation of a partial vacuum in the cartridge as its contents are used up, without the need to provide a separate venting mechanism such as holes drilled in the cartridge.

15 The cleaning head of the tool is typically provided with a means for conveying the cleaning liquid to the outer surface of the cleaning head. This can suitably be in the form of a tube or preferably a plurality of tubes connecting the
20 pumping means to the external surface of the cleaning head, or alternatively can be as a result of the cleaning head being formed from a porous material such as sponge or a synthetic sponge material.

25 Preferably the cleaning head is provided with an array of bristles or synthetic bristles on its external surface. The bristles may be fastened to the cleaning head according to techniques known in the art such as fusing-on or staple-setting.

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Most preferably the bristles are arranged in tufts, and fluid continuous channels lead from the interior of the cleaning head to the base of each of the arrays of bristles on the cleaning head. This arrangement provides an additional hygiene benefit since it ensures that the cleaning fluid comes into contact with the base of each of the arrays of bristles.

Furthermore, by judicious selection of the rheological properties of the cleaning fluid and the bristle profile, it is possible, through a combination of fluid viscosity and capillary action, to retain a residue of cleaning fluid in the interstices of the bristle tufts between uses of the tool. This ensures that the tool stays hygienically clean and fresh between uses. It is preferred to use transparent or translucent bristle tufts to enable visualisation of this residue of cleaning fluid.

Thixotropic household cleaning fluids are preferred for use in conjunction with the tool according to the invention, since these may be pumped without running or dripping after pumping.

Because of the potentially harmful nature of the cleaning fluid, the tool is preferably equipped with a locking device that prevents accidental pumping of liquid to the head or its use by young children. A preferred form of locking device is a twist-lockable fitting which is enabled and disabled by rotation of the cartridge about its long axis, and in which accidental movement of the cartridge between pumping and non-pumping positions is prevented by a co-

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operating projection and recess arrangement (e.g. of the "bayonet" type) on the cartridge and the housing respectively. Most preferred is an arrangement of this type which also prevents accidental pumping of fluid during
5 cartridge insertion, i.e. after insertion, the cartridge must be rotated to the unlocked position in order to enable actuation of the pump.

The cartridge and housing may be marked with alignment
10 indicators to show the locked and unlocked positions of the cartridge.

It is also preferred if the user can easily determine when the cleaning fluid in the cartridge has been used up and the
15 cartridge needs to be replaced. In a preferred form of the invention, parts of the housing, the cartridge, the pumping means or the cleaning head are made from a transparent or translucent material such that the user can visually ascertain whether fluid remains in the cartridge.

20 It is also desirable that the tool is provided with a suitably shaped pot for storage when not in use. In a preferred form, the housing is provided with a closure skirt which acts to form a lid on the pot when the tool is placed
25 in the pot. Preferably the closure skirt makes a snap fit with the corresponding upper surfaces of the pot with which it interengages. This enables easy assembly of the tool by the user from a kit of component parts. The pot is also preferably provided with a well for collecting any residual
30 liquid which may drip from the cleaning head after use, and may be lined with a hygienic liner, e.g. of antibacterial

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material. It is desirable that the tool is supported in the pot by the skirt, rather than by the tool resting on the cleaning head. One option for preventing the use of the tool by children is to provide the tool and pot with a locking device such that this must be manipulated to remove the tool from the pot. A preferred form of locking device involves co-ordinated downwards pushing and twisting of the tool relative to the pot to disengage the lock. The pot preferably has grips attached to its base to prevent it from sliding on slippery floors.

Suitable materials for the housing, handle and cartridge are any rigid easily formed materials which will be readily evident to the skilled person. Preferred materials are thermoformable polymers that are resistant to attack from the chemicals in household cleaning fluids.

A specific example of a toilet brush according to the invention is shown in the accompanying figure:

Figure 1 shows a cross section through a household cleaning tool (1).

The tool (1) is seated in a storage pot (2), and has an elongate housing (3) which is in the form of a rigid sleeve furnished with an inclined handle (4) and a cleaning head (5). A pump (6) is located in the base of the main body of the housing (3). A plurality of fluid continuous channels, shown representatively as (7), lead from the interior surface to the exterior surface of the cleaning head (5),

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which exterior surface is provided with an array of bristle tufts, two of which are shown schematically as (8).

A rigid elongate axisymmetric cartridge (9) containing
5 household cleaning fluid (10) is located in the sleeve of
the housing (3) and is connected with the housing (3) by
means of a twist-lockable bayonet coupling (11) between
housing (3) and cartridge (9). The connection is prevented
from leaking by a flexible washer (12). A hollow needle
10 (13) is provided between the pump (6) and the cartridge (9),
so that when the cartridge (9) is screwed into place, the
needle (13) penetrates a flexible silicone sealing septum
(14) which seals the neck of the cartridge (9). This allows
(14) allowing cleaning fluid (10) to enter the pump (6)
15 through the hollow needle (13).

In order to operate the tool, the cartridge (9) is pushed
down in the direction of the cleaning head (5) which causes
the pump (6) to be actuated, thereby transferring cleaning
20 fluid (10) from the cartridge (9) through the channels (7)
to the array of bristle tufts (8). This action also
compresses a spring (15) located between the pump (6) and
the interior surface of the cleaning head (5), so that after
the pumping action, the spring can return the cartridge (9)
25 to its starting position.

The elongate housing (3) is provided with a closure skirt
(16) that snap fits onto the pot (2) to form a lid on the
pot (2) when the tool (1) is in the pot (2). The pot (2) is
30 also provided with a well (16) for collection of any

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residual cleaning fluid (10) that drains from the cleaning head (5).

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CLAIMS

1. A household cleaning tool (1) comprising a elongate housing (3) having at one end an inclined handle (4) and at
5 the other end a cleaning head (5), the housing further comprising:

(a) connection means (11) located between the handle (4) and the cleaning head (5) for the engagement of a removable
10 cartridge (9) of household cleaning fluid (10), and

(b) pumping means (6) located between the connection means (11) and the cleaning head (5) for the transfer of household cleaning fluid (10) from the cartridge (9) to the cleaning
15 head (5);

in which the cartridge (9) is removable from the housing (3) by disengaging the connection means (11) and pulling the cartridge (9) from the housing (3),

20 and in which the cartridge (9) is slidably received in the housing (3) and can be pushed down in the direction of the cleaning head (5) in order to actuate the pumping means (6) and thereby dispense the household cleaning fluid (10) from
25 the cartridge (9) to the cleaning head (5) via the pumping means (6).

2. A tool (1) according to claim 1 in which a biasing means (15) located between the pumping means (6) and the
30 cleaning head (5) returns the cartridge (9) to its starting

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position after it has been pushed down to dispense the household cleaning fluid (10).

3. A tool (1) according to claim 1 or claim 2, in which
5 the cartridge (9) is provided with a self-sealing closure (14) to prevent leakage of fluid (10) from the cartridge (9) when the cartridge (9) is removed from the housing (3).

4. A tool (1) according to any one of claims 1 to 3, in
10 which the self-sealing closure (14) is in the form of a flexible silicone septum.

5. A tool (1) according to any one of claims 1 to 4, in which the cleaning head (5) is provided with a plurality of
15 channels (7) for conveying fluid (10) from the interior to the exterior surfaces of the cleaning head (5).

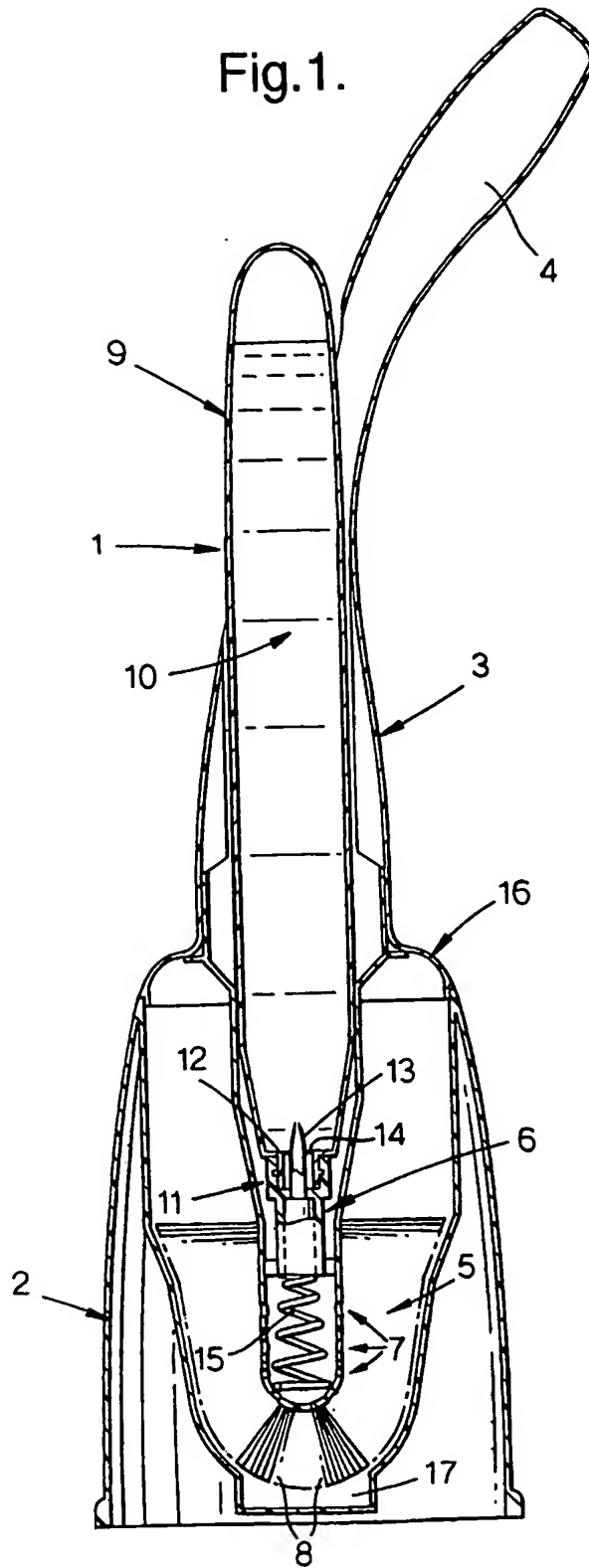
6. A tool (1) according to any one of claims 1 to 5, in which the connection means (11) is twist-lockable, and
20 unlocking is necessary before the pumping means (6) can be actuated.

7. A tool (1) according to claim 6, in which locking or unlocking takes place by rotating the cartridge (9) about
25 its long axis.

8. A tool (1) according to any one of claims 1 to 7, which further comprises a pot (2) for retention thereof when not
30 in use.

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Fig.1.



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A47K11/10 A46B11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47K A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	---	3
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

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Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 02/02508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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